IN THE NAME OF GOD

Allergy

Dr. Shakibasefat

Allergy

- Identify PTs c true allergic history
- Recognize head, neck, and oral tissue changes
- Plan appropriate dental care for PTs c sever immune system alterations
- Recognize signs & symptoms of acute allergic reactions and manage these problems

BOX 19-12 Signs and Symptoms Suggestive of an Allergic Reaction

- Urticaria
- Swelling
- Skin rash
- Chest tightness
- Dyspnea, shortness of breath
- Rhinorrhea
- Conjunctivitis

Allergy

Abnormal or hypersensitive response
of the immune system to a **substrance** introduced into the body

15% -25% of Americans demonstrate allergy:

Asthma, allergy to drugs & insect stings

Allergic reactions account for 6%- 10% of all adverse drug reactions:

46% erythema & rash

23% urticaria

10% fixed drug reaction

5% erythema multiforme

1% anaphylaxis

Allergy

The most common cause of urticarial reaction:

In adults: drugs

In children: food & infection

Allergic reactions because of:

Iodinated organic compounds

Animal insulin

Penicillin

Atopic history

Antihistamin & steroid tab(colored coating material)

Dyes in toothpaste

Paraben/ sulfits(sodium metabisulfite)

latex

4 Immunologic Hypersensitivity Reaction

BOX 19-3 Coombs and Gell Classification of Immunologic Hypersensitivity Reactions

- *Type I*—anaphylactic or IgE-mediated
- *Type II*—cytotoxic
- *Type III*—immune complex–mediated
- *Type IV*—cell-mediated or delayed

IgE, Immunoglobulin E.

4 Immunologic Hypersensitivity Reaction

Type I/II/III

humoral, occur soon after contact

Type IV

cellular, delayed onset

Dental management

- One of the most common concerns is patient reported allergy to a **local anesthetic, antibiotic, or analgesic**.

- allergic nature
- If signs or symptoms were not reported, the patient probably did not experience a true allergic reaction.

- Common examples of reactions mislabeled as “allergy” are **syncope after injection of a local anesthetic** and **nausea or vomiting** after ingestion of codeine

BOX 19-14 Adverse Reactions to Local Anesthetics

- Toxicity
- Central nervous system stimulation
- Central nervous system depression
- Vasoconstrictor effects
- Anxiety
- Allergic reaction

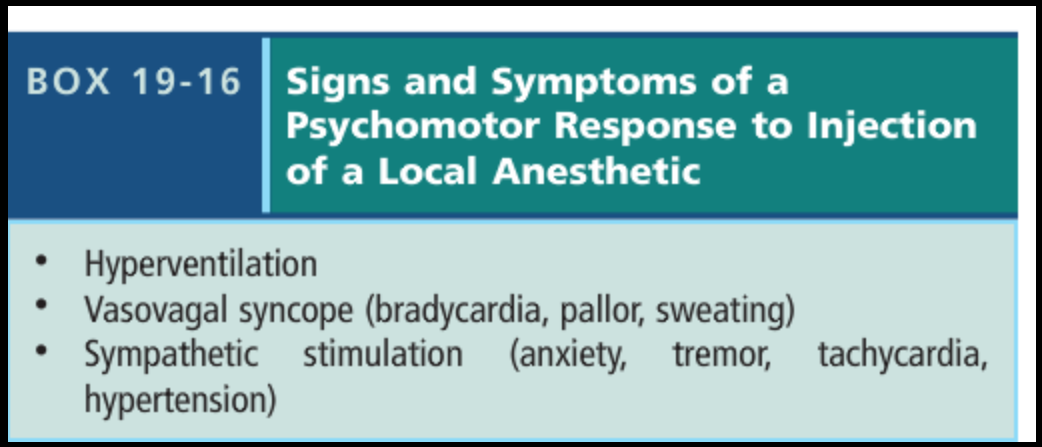
BOX 19-15 Signs and Symptoms of a Toxic Reaction to Local Anesthetic

- Talkativeness
- Slurred speech
- Dizziness
- Nausea
- Depression
- Euphoria
- Excitement
- Convulsions

Another common reaction to local anesthetics

anxious patient who has **concern about receiving a "shot,"**

- Tachycardia,
- Sweating,
- Paleness,
- Syncope.



BOX 19-16 Signs and Symptoms of a Psychomotor Response to Injection of a Local Anesthetic

- Hyperventilation
- Vasovagal syncope (bradycardia, pallor, sweating)
- Sympathetic stimulation (anxiety, tremor, tachycardia, hypertension)

Signs and symptoms of a vasoconstrictor reaction

Tachycardia

paleness

Sweating

Local anesthetic

True allergic reactions to the local anesthetics (amides) most often used in dentistry are rare.

If history : toxic or vasoconstrictor:

1-Explain the nature of the previous reaction

2-limiting the amount of solution to the recommended dose

3-avoid injecting the local anesthetic solution intravenously by aspirating before

If history :faint

the dentist's primary task will be to work with the patient to reduce anxiety during dental visits.

If history: true allergic

1- try to identify the type of local anesthetic that was used.

2-Once this has been ascertained ,a new anesthetic with a different basic chemical structure can be used.

Local anesthetic

Two main groups of local anesthetics :

1-Para amino benzoic acid (PABA) esters

(**procaine** [Novocain] and **tetracaine** [Pontocaine])

2- Amides

(articaine [Septocaine], bupivacaine [Mar caine], lidocaine [Xylocaine], mepivacaine [Carbo caine], and prilocaine [Citanest])

- Benzoic acid ester anesthetics may cross react with each other but not Amids
- Cross reaction does not occur between ester and amide local anesthetics

Local anesthetic

- Procaine (highest incidence of allergic reactions.)

Its antigenic component appears to be PABA, one of the metabolic breakdown products of procaine.

Cross reactivity has been reported between lidocaine and procaine

This was traced to the presence of a germicide, **methylparaben**, which previously was used in small amounts as apreservative and is chemically similar to PABA.

Methylparaben is no longer used as a preservative, so this problem is no longer a concern.

Local anesthetic

- Whenever, cannot identify the specific agent :

1-contact the previous dentist

2-If this fails, two additional options are available:

1-An antihistamine (e.g., diphenhydramine [Benadryl]) can be used as the local anesthetic.

2-The patient may be referred to an allergist for **provocative dose testing (PDT)**

Local anesthetic (diphenhydramine)

- A 1% solution of diphenhydramine that contains epinephrine can be easily compounded by a **pharmacist,** but it must be confirmed that methyl paraben is not used as a preservative.
- This solution induces anesthesia of **about 30 minutes** average duration and can be used for infiltration or block injection.
- When it is used for a mandibular block, 1 to 4 mL of solution is needed. Some patients have reported a **burning sensation, swelling, or erythema** after a mandibular block with 1% diphenhydramine, but these effects were not serious and cleared within 1 or 2 days.
- **No more than 50 mg of diphenhydramine should begiven during a single appointment.**
- Diphenhydramine also can be used in the patient who reports a previous allergic reaction to either an ester or amide local anesthetic.

Local anesthetic & PDT

skin testing and PDT

- **skin testing** alone for allergy to local anesthetics is of **little benefit** because **false positive** results are common;
- **Allergist also should perform PDT**.

Sending samples for specific testing of the clinician's usual anesthetic agents without vasoconstrictors is of great help.

Local anesthetic & PDT

On the basis of patient history,

1- the **allergist** selects a local anesthetic for testing that is least likely to cause an allergic reaction(amide group because they generally do not cross react with each other).

At 15minute intervals, 0.1 mL of test solution is injected subcutaneously, with concentrations increasing from 1 : 10,000 to 1 : 1000 to 1 : 100 to 1 : 10,followed by undiluted solution; next, 0.5 mL of undiluted test solution is tried; and finally, 1 mL of undiluted solution is given.

prepared to deal with any adverse reaction

Allergist should report to the dentist

on the drug selected,

the final dose given,

and the absence of any adverse reaction.

Malamed has reported that he has not dealt with a single patient for whom a safe local anesthetic could not be found through the PDT procedure.

alternative anesthetic in a patient with a history of a local anesthetic allergy

- Dentist should follow these steps:

1. Inject slowly, aspirating first to make sure that a vessel is not being injected.
2. Place 1 drop of the solution into the tissues.
3. Withdraw the needle, and wait 5 minutes to see what reaction, if any, occurs. If no allergic reaction occurs, as much anesthetic as is needed for the procedure should be deposited. Be sure to aspirate before giving the second injection (see Box 19-17).

Penicillin
(different routes of administration)

sensitization

Oral administration :only about 0.1% of pts

IM :1%to 2%

Topical application : about 5% to 12%.

the use of penicillin in a topical ointment is contraindicated.

the oral route is preferable for administration whenever possible.

Observe PT for 30 minutes after the first dose, if possible

seek immediate care if any of the signs or symptoms of an allergic reaction occur

Penicillin
several points

Skin testing for allergy to penicillin, much more reliable than local anesthetic

cost effective:

only on patients with a history of penicillin reaction who need penicillin for a serious infection.

Important point : penicillin reactivity declines with time

(negative skin test)

The length of time for retaining sensitivity is variable

dependent on IgE levels.

Most anaphylactic reactions to penicillin : in pts who have been treated in the past with penicillin but reported no adverse reactions.

Penicillin

both metabolic breakdown products of penicillin must be tested;

major derivative, penicilloyl polylysine,

& minor derivative mixture

95% of penicillin is metabolized to the major determinant and 5% to the minor determinants.

If skin test results are negative for both breakdown products, the patient is considered not allergic to penicillin & so on.

When penicillin must be used, the patient with a positive result on skin testing can be desensitized to it.

The incidence of anaphylactic reactions is higher in patients who test positive for the minor derivative mixture than do patients who test positive for the major derivative.

PTs c hx of penicillin allergy

erythromycin or clindamycin for oral infection

clindamycin for IE prophylaxis

drugs that may cross react:

- Ampicillin
- carbenicillin
- Methicillin

so avoided

Cephalosporins

often used as alternatives to penicillins

cephalosporins cross react in 5-10% of penicillin sensitive pts.

The risk is greatest with first and second generation drugs.

Cephalosporins **major determinant, cephaloyl** ,
may cross react with the **major determinant of penicillin**.

Cephalosporins usually can be used in patients with a history of distant, non serious reaction to penicillin.

If positive penicillin skin test ,but negative cephalosporin skin test
The cephalosporin that was tested can be used.

Analgesics (Aspirin)

gastrointestinal upset (so take with food or a glass of milk).
discomfort may include “heartburn,” nausea, vomiting, or GI bleeding.

Avoid aspirin

1.Gastritis
2.hiatal hernia
3.prolong prothrombin time
hemorrhagic disease, peptic ulcer

Many people (about 2 in 1000) are allergic to salicylates
Allergic reactions to aspirin can be serious, deaths have been reported
4.Asthma (acute bronchospasm, rhinorrhea, & urticaria)

Analgesics (NSAIDs)

NSAIDs are inhibitors of:

prostaglandin formation,

platelet aggregation

prothrombin synthesis.

Most have the potential for crosssensitivity in patients who exhibit an asthmalike reaction to aspirin.

Analgesics (NSAIDs)

Avoid NSAIDs

asthma

patients with an ulcer or hemorrhagic

pregnant

Nursing

selective COX2 inhibitors (less GI disturbance)

may cause :renal dysfunction /elevated blood pressure

precipitate heart failure in vulnerable patients.

NSAIDrelated cardiotoxicity is relatively rare and is seen in elderly persons with concomitant disease.

wide spread longterm use in highrisk groups is potentially hazardous.

Narcotic Analgesics

Codeine (analgesic doses)

Emesis

nausea

constipation

Miosis and adverse renal, hepatic, cardiovascular, and bronchial effects are not likely to occur with therapeutic doses.

Most of reactions to codeine

Nonallergic GI manifestations

Rubber Products

1-6% of general pop and 5-18% of HCP

at risk for hypersensitivity reactions to latex/agents in rubber gloves, rubber dam, blood pressure cuff, catheters

Latex from surgical gloves:

Cardiovascular collapse in surgical patients, hypersensitivity reactions & anaphylaxis

most cases in health providers: type IV reactions

Anaphylaxis may occur in the sensitized person

latexallergic persons have IgE antibodies for specific latex proteins.

Latex skin test

Nitrile gloves minimize these adverse reactions to latex proteins.

Dental Materials & Products

Type I, type III, and type IV hypersensitivity reactions result from various dental materials and products

Topical anesthetic agents: type I reactions urticarial swelling

Mouthrinses , toothpastes (phenolic compounds , antiseptics, astringents, or flavoring agents) : types I, III, IV hypersensitivity reactions involving the oral mucosa or lips.

Hand soaps : type IV reactions

Type IV hypersensitivity(contact stomatitis) :

dental amalgam/ acrylic/ composite resin/ Nickel/ palladium/ chromium, cobalt /Eugenol /rubber products/ talcum powder/ mouthwashes/toothpastes.

Hereditary Angioedema

condition that can be provoked by dental surgery and trauma

Androgens such as **danazol and stanozolol** increase hepatic production of C1 inhibitor decrease the number and severity of attacks **(Cinryze or Berinert)**

Hereditary Angioedema does not respond well to epinephrine or antihistamines.

Oral Complications and Manifestations

Hypersensitivity typeI-IV

Type I Hypersensitivity

urticarial swelling or angioedema

Atopic reactions to various foods, drugs, or anesthetic agents may occur within or around the oral cavity

The reaction generally is rapid, within a short time

painless, soft tissue swelling produced by transudate from the surrounding vessels may cause itching and burning.

The lesion can be present for 1 to 3 days if untreated but will resolve spontaneously.

Oral diphenhydramine, 50 mg every 4 hours, is the recommended regimen for 1 to 3 days.

Further contact with the antigen must be avoided.

FIGURE 19-2 Angioedema of the upper lip that occurred soon after injection of a local anesthetic.

Type I Hypersensitivity (repetitive)

urticarial swelling or angioedema

Oral diphenhydramine, 50 mg every 4 hours for 1 to 3 days.

BOX 19-21 Oral or Paraoral Type I Hypersensitivity Reactions

1. Urticarial swelling (or angioedema)
   a. Reaction occurs soon after contact with antigen.
   b. Reaction consists of painless swelling.
   c. Itching and burning may occur.
   d. Lesion may remain for 1 to 3 days.
2. Treatment
   a. Reaction not involving tongue, pharynx, or larynx and with no respiratory distress noted requires 50 mg of diphenhydramine four times a day until swelling diminishes.
   b. Reaction involving tongue, pharynx, or larynx with respiratory distress noted requires the following:
      (1) 0.5 mL of 1:1000 epinephrine, IM or SC
      (2) Oxygen
      (3) Once immediate danger is over, 50 mg of diphenhydramine should be given four times a day until swelling diminishes.

Type III Hypersensitivity

Foods, drugs, other agents cause:

white, erythematous, or ulcerative lesions (immune complex reactions)

develop rather quickly within a 24hour period

Some cases of aphthous stomatitis

Allergic dermatitis(nickel hypersensitivity)

EM

FIGURE 19-3 Stomatitis in a patient who was found to be allergic to the toothpaste he was using. *(From Neville BW, et al:* Oral and maxillofacial pathology, *ed 3, St. Louis, 2009, Saunders.)*

FIGURE 19-4 Allergic rash on the abdomen of a patient in whom orthodontic brackets and archwires were just placed. The patient was tested and was found to be allergic to the nickel in the wires.

Erythema Multiforme

polymorphous eruption of macules, erosions, and characteristic “target” lesions that are symmetrically

Sulfa antibiotics most commonly are associated with the onset of erythema multiforme.

Sulfonyl urea hypoglycemic agents (e.g., tolbutamide, tolazamide, glyburide,glipizide)

symptomatic therapy :

bland mouth rinse

syrup of diphenhydramine

triamcinolone acetonide (Kenalog) in Orabase.

more severe : systemic steroids

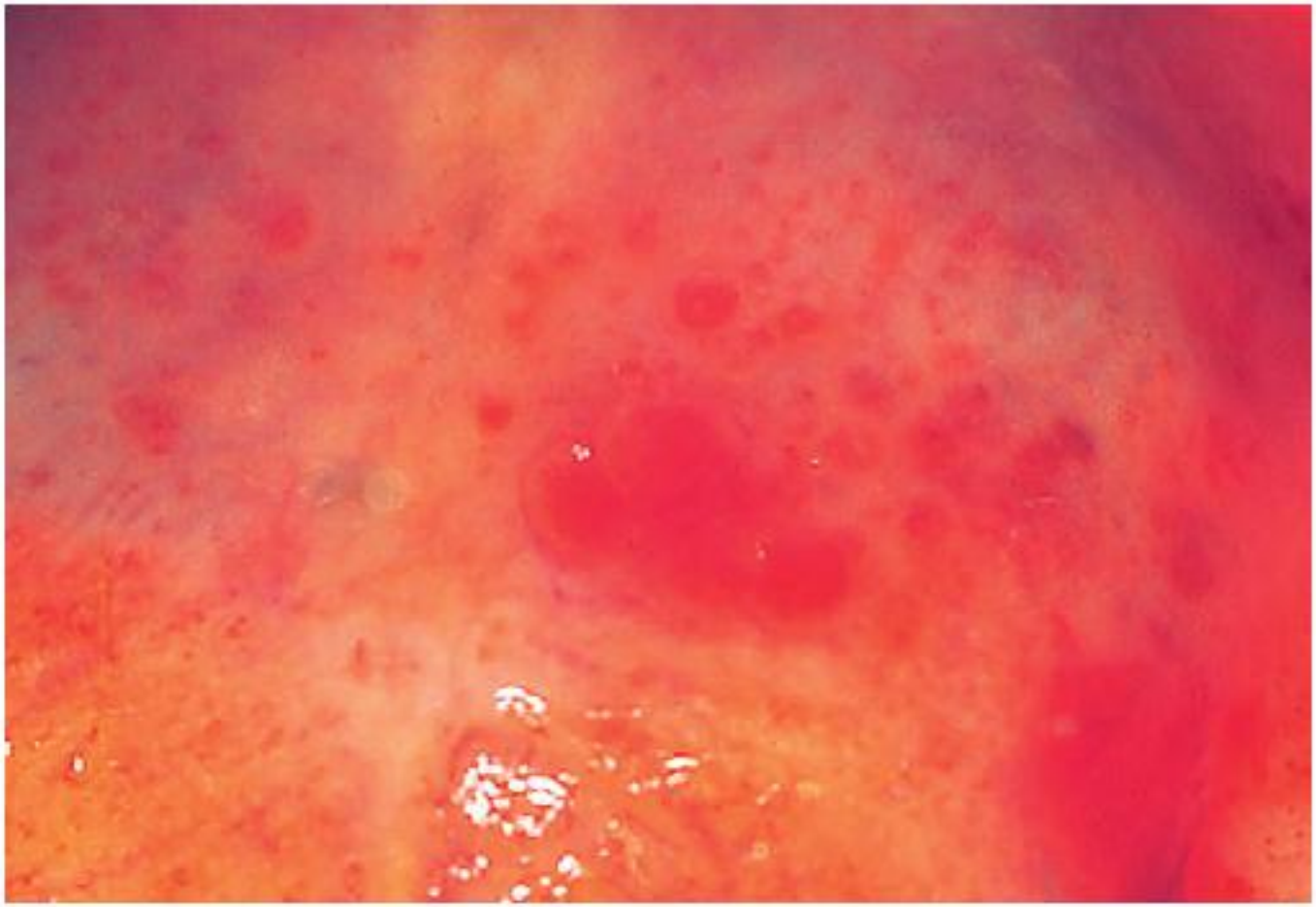


FIGURE 19-5 Erythema multiforme that developed after oral administration of a drug used to treat an oral infection. Ulceration of the palatal mucosa.

Type III Hypersensitivity

BOX 19-22 Type III Hypersensitivity Reactions

1. Usually occur within 24 hours after contact with antigen
2. Consist of:
   a. Erythema
   b. Rash
   c. Ulceration
3. Treatment requires
   a. Topical steroids or systemic steroids (in severe cases)
   b. Identification of antigen
   c. Avoidance/elimination of any further contact with antigen

Rationale for Treatment

Treatment is primarily antiinflammatory in nature. Steroids are initiated and then tapered. Because of the possible relationship of oral erythema multiforme with herpes simplex virus, suppressive antiviral therapy may be necessary before steroid therapy is initiated. Patients should be questioned carefully about a previous history of recurrent herpetic infection and prodromal symptoms that may have preceded the onset of erythema multiforme.

Dosing must be titrated to specific situations.

Steroid Therapy

Rx:
Prednisone tablets 10 mg
Disp: 100 tablets
Sig: Take 6 tablets in the morning until lesions recede; then decrease by 1 tablet on each successive day.

Suppressive Antiviral Therapy. Renew, as needed, the following:

Rx:
Acyclovir (Zovirax) 400-mg capsules
Disp: 90 capsules
Sig: Take 1 tablet 3 times a day.

Rx:
Valacyclovir (Valtrex) 500-mg capsules
Disp: 30 capsules
Sig: Take 1 tablet daily.

Type IV Hypersensitivity

Contact stomatitis :delayed allergic reaction

cellular immune response

The antigen :

in dental materials , toothpaste, mouth rinses, lipsticks, face powders, and so forth.

no further treatment , source of the antigen

severe or persistent tissue reaction: topical corticosteroids

Type IV Hypersensitivity

Impression materials containing an **aromatic sulfonate catalyst** :

delayed allergic reaction in postmenopausal women

ulceration and necrosis progressively worse with exposure.

lesion close association with amalgam restorations

whitish, reddish, ulcerative, or "lichenoid".

When restorations were removed, no lesions

skin testing for mercury sensitivity

some of the oral lesions resulted from toxic injury /type IV hypersensitivity reaction to mercury

Oral epi mucous testing

placing the suspected antigen in contact with the oral mucosa / observing for any reaction over a period of several days

(e.g., erythema, sloughing, ulceration)

reaction : at least 48 to 72 hours

Methods:

1- in a rubber suction cup

2- in a depression on the palatal aspect of an overlay denture.

3- into Orabase

4- into an oral adhesive spray.

Skin testing and oral epimucous testing : not foolproof

unreliable tissue responses (trauma ,no tissue reaction occurs)

Lichenoid Drug Eruptions

certain drugs :

levamisole (Levantine) /quinidine /Thiazides/Gold/ mercury/methyldopa/ phenothiazines/some antibiotics.

If these drugs are withdrawn, the lesions clear within several days /within a few weeks.

Angioedema

immediate type I hypersensitivity reaction : edema of the tongue, pharyngeal tissues, or larynx,

emergency steps to prevent death from respiratory failure.

if the patient has not responded to **the initial procedures** and is in acute respiratory distress,

1- Activate emergency medical service (EMS).

2- Inject 0.3 to 0.5 mL of 1 : 1000 epinephrine by an intramuscular (into the tongue) or subcutaneous route

3- Supplement with intravenous diphenhydramine 50 to 100 mg if needed

Support respiration, if indicated, by mouth to mouth /bag (chest)

4- Check the carotid or femoral pulse; if a pulse cannot be detected, closed chest cardiac massage should be initiated.

5- Confirm emergency medical service is on their way, and transport to medical facility if needed.

Anaphylaxis

within minutes but may take longer

In contrast with a severe edematous reaction, in which respiratory distress occurs first, both **respiratory and circulatory components** of depression occur early in the anaphylactic reaction.

An aphylaxis often is fatal unless vigorous, immediate action is taken

Anaphylaxis

1- Have someone in the office call 911 or activate EMS

2- Place the patient in a supine position.

3- Assess airway, breathing, circulation, and level of consciousness

4- Establish a patent airway and administer oxygen.

5- Inject 0.3 to 0.5 mL of 1 : 1000 epinephrine by an intramuscular (into the tongue) or subcutaneous route.

6- If no pulse is detected, support circulation through closed-chest cardiac massage. Support respiration by mouthto-mouth breathing.

7- Repeat the injection of epinephrine every 5 minutes as needed to control symptoms and blood pressure.

Note: Intramuscular injection of epinephrine into the thigh has been reported to provide higher plasma concentrations than those administered into the arm.

BOX 19-23 Signs and Symptoms of Anaphylaxis

- "Itching" of soft palate
- Nausea, vomiting
- Substernal pressure
- Shortness of breath
- Hypotension
- Pruritus
- Urticaria
- Laryngeal edema
- Bronchospasm
- Cardiac arrhythmias